

Common Quality Problems of Prefabricated Components and Solutions

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Abstract

In recent years, with the rapid development of China's economy, the construction industry continues to push through the old and bring forth the new, and the assembly structure has been developing rapidly like mushrooms after a spring rain. However, the introduction of the assembly structure into China is relatively short and late, and there are many shortcomings and shortcomings in many aspects, which need to be improved and perfected. This paper analyses the fabrication, acceptance, transportation and hoisting of prefabricated concrete structural members, summarizes the quality problems existing in prefabricated concrete structural members, and puts forward corresponding solutions for different quality problems, which provides basis and reference value for quality control of later prefabricated structural members, and improves the quality of prefabricated components in construction projects.

Keywords

Precast concrete, structural component, quality problem, resolvent.

1. Introduction

With the rapid development of China's economy, assembly buildings can be built in batches like production machines. People transport the components of the house produced in the factory to the construction site, and the workers install them according to the relevant regulations. The completed building is the assembly building. Therefore, the definition of the assembly building is the building which assembles the components of the prefabricated products on the site. According to the form and construction method of prefabricated components, there are five types: block building, slab building, box building, skeleton slab building and lifting slab building.

Assembled architecture was first studied and tried many times by some western countries, such as Britain and France. It was not until the 1960s that it was successfully realized from the beginning of the 20th century. Because of the fast construction speed, short construction period, mechanized construction technology, low production cost and other characteristics of assembly building. As a result, assembly buildings have sprung up rapidly all over the world. In recent years, the development in China is particularly rapid. Some governments have also issued some policies. For some buildings, assembly buildings must be adopted. For example, Shanghai has promulgated policies to implement General Contracting Bidding for assembling guarantee housing: Shanghai Construction Material Industry Market Management Station and Shanghai Housing Construction Development Center jointly issued a notice requiring Shanghai Assembly guarantee housing projects to adopt General Contracting Bidding for design (survey), construction and component procurement projects; and implement "two compulsory ratios" at the source of land: in the supply area in 2015. The proportion of building area of assembled buildings in total is not less than 50%; all new civil buildings within the Outer Ring Line in 2016 are assembled buildings, with more than 50% outside the Outer Ring Line; from 2017, the proportion outside the Outer Ring Line has increased year by year on the basis of 50%. Hubei Province promulgated policies: three stages to promote assembly to 80%: In March 2016, the government of Hubei Province promulgated "Opinions on Promoting the Modernization of Construction Industry". By 2025, the prefabrication rate of concrete construction projects and the assembly rate of main structures of steel and wood structures will reach more than 40%. With the

vigorous implementation of assembly building by the state, the problems of assembly building are also exposed, such as the quality problems caused by the immature construction technology of prefabricated assembly building, the imperfection of construction quality management system and so on. The existing methods of controlling construction quality are all aimed at cast-in-place structure, and are not suitable for prefabricated assembly building. Therefore, this paper analyses the fabrication, acceptance, transportation and hoisting of prefabricated concrete structural members, summarizes the quality problems existing in prefabricated concrete structural members, and puts forward corresponding solutions for different quality problems, which provides the basis and reference value for the quality control of prefabricated structural members in the future, and improves the quality of prefabricated concrete structural members in construction projects.

2. Common Quality Problems of Prefabricated Components

2.1 Production and Processing

Lack of edge, uneven, vertical, protrusion, depression, honeycomb, hole, peeling, hemp surface, steel bar exposure and so on are some problems of precast concrete components. Most of these problems are caused by poor sealing of formwork, slurry leakage, or inadequate or excessive vibration of vibrating concrete, uneven distribution of mortar. In addition, various kinds of damages, such as cracks, will occur in the process of transportation or hoisting. The main reasons for this phenomenon are that the span of prefabricated concrete members is too large, the structure is too large and heavy, and the span is too large, which is caused by friction and collision in the process of transportation. When hoisting, the prefabricated concrete members will break, slightly, cracks will occur, and cracks will develop further. Exhibitions can also lead to damage to prefabricated concrete members.

2.2 Joint Leakage

Joint leakage is an important factor affecting the quality of prefabricated components of assembly building, because if the joint leakage will affect the waterproof quality of assembly building, if there are problems in waterproofing, it will directly affect the use function of the building, which will have great hidden dangers. Waterproofing is considered in the design of assembled buildings, but the waterproofing problems caused by joint leakage are seldom considered. In order to ensure the normal use of the structure and make the use of the function of the structure play a better role, various problems such as design, construction, heat preservation, waterproof and so on should be fully considered in the design.

2.3 Hoisting

Before the hoisting of prefabricated concrete, we must do a good job of hoisting construction plan, because each assembled building is unique and can not be repeated. Construction should formulate effective construction plan according to the shape, size, weight, installation height, installation location and other site conditions of prefabricated components, so as to avoid accidents that can not be completed by hoisting for many times, so as to reduce the number of accidents. The quality of assembled prefabricated building components caused by fewer times of hoisting.

2.4 Install

If the pre-embedded pipeline passage in precast concrete members is blocked, the location deviation will affect the construction, which will lead to the construction process of the crossing is not smooth, or can not go through, have to destroy the original prefabricated structure to achieve the purpose of crossing, thus destroying the precast concrete components, in addition, the operation level of the pre-embedded pipeline crossing constructors will also affect the quality of components. If the construction personnel can not accurately judge the corner angle of the pipeline, it will often lead to the destruction of concrete components.

2.5 Finished Product Protection

Precast concrete components need to be stored in factories and construction sites before installation. In these processes, improper storage or protection of precast concrete components will lead to the destruction of precast components.

3. Solutions

3.1 Production and Processing

The quality of prefabricated concrete structural components directly determines the quality of assembled buildings. Therefore, when making components, it is necessary to ensure that the size and shape of prefabricated components meet the requirements of the structure, that all the materials needed for production components are tested one by one, that the stiffness and strength of the moulds used for production components meet the requirements, and that the moulds should be horizontal when they are installed and fixed. Vertical and airtight. The types and sizes of steel bars used in the production of precast concrete members should meet the requirements, the location of pipelines should be reserved to ensure its accuracy, the curing time of precast concrete members after pouring should meet the requirements of specifications, and the appropriate tools should be selected for small or large precast members when they are vibrating.

3.2 Design of Prefabricated Components

In the design, it is necessary to ensure that the span of prefabricated concrete members is not too large, so as to reduce the damage caused by the excessive span deflection during hoisting. In addition, in order to prevent the leakage of joints, we can set the joints as entrails, and try to complete the casting at one time, so as to avoid repeated pouring.

3.3 Lifting and Acceptance

Before the hoisting of prefabricated concrete, we must do a good job of hoisting construction plan, because each assembled building is unique and can not be repeated. Construction should formulate effective construction plan according to the shape, size, weight, installation height, installation location and other site conditions of prefabricated components, so as to avoid accidents that can not be completed by hoisting for many times, so as to reduce the number of accidents. The quality of assembled prefabricated building components caused by fewer times of hoisting. In addition, some embedded parts are protected, such as the toilet with plastic cover and short pipe connection protection measures, which reduces the late damage of embedded parts caused by concrete inflow. Another point of this method is that these protective parts are reusable, saving materials and protecting the environment. Finally, in the near-field acceptance of prefabricated concrete structural members, the quality, performance, function and dimension errors of components must follow the relevant norms, so as to ensure the quality of prefabricated components.

3.4 Finished Product Protection

After the manufacture of prefabricated concrete components is completed, they need to be transported to the construction site and stored at the construction site for a period of time. In order to avoid damage to the prefabricated components caused by transportation and storage at the construction site, we should formulate corresponding transportation and storage schemes for different prefabricated components to ensure that the prefabricated components are intact and intact. It is necessary to classify the prefabricated components in an orderly manner when they are stored at the site. Bracket protection can be used.

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